BIOLOGICAL RHYTHMS AND SHIFT WORK

SHIFT WORK AND SOCIETY:
DEMOGRAPHICS AND SOCIAL IMPLICATIONS

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Oct. 17, 1990

J952-90

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Introduction

About one in five employed Americans do not regularly work a standard daytime schedule (Presser, 1990a). Instead, they work evenings, nights, a "split" or extended shift of more than 12 hours, or a rotating shift in which the hours change regularly--for example, from day to evening to night. Given that such a substantial proportion of our population--representing about 20 million Americans--is working non-standard hours, it is important that we know who these people are--their distinctive characteristics relative to those who work standard hours, why they work these hours, and what the consequences are--for them, for their families, for employers, and for the society at large.

This paper brings together existing literature on this topic, with specific reference to the demographic and social aspects of shift work. It is not within the scope of this paper to address health or psychological aspects of shift work, although these clearly are important dimensions that also merit our attention. Research on shift work in the United States, regardless of topic, is scanty, and this is particularly the case for the study its demographic and social aspects. Yet such knowledge is essential if we are to understand the context in which shift work affects individuals, whatever these effects may be, and if we are to have a sense of scale about the size of any positive or negative consequences that shift work may have, and want to anticipate future trends. I begin with some demographic considerations.

The Demography of Shift Work in the United States

A basic demographic issue is the overall prevalence of shift work at the national level. Such estimates vary depending on the definition used. Thus it is important to consider how shift work is measured in national surveys.

Defining a shift worker

Who is a shift worker? We generally mean someone who does not regularly work a "standard" daytime work schedule, but what is "standard?" Not only is this an arbitrary determination, but so is the definition of an evening, night, or split shift, and of what constitutes shift rotation. There is considerable variation in the work hours of "non-standard" schedules, depending upon the nature and place of employment.

Generally, national surveys ask about shift work in one of two ways: (1) by having respondents self-classify their shift, with minimal if any instruction provided; and (2) by asking respondents about the specific hours they work (each day or most days of the week), and then determining their shift status according to precise definitional rules. There are limitations to each approach.

Self-classification provides responses that are difficult to interpret. For example, one respondent may call him or herself a "day" worker when he or she works between 1 p.m. and 9 p.m.; another with the same hours of employment may regard him or herself as an "evening" worker. They would classify themselves differently, but work identical hours. The advantage of self

classification is that it requires only one question on a questionnaire, minimizing respondent time and cost.

In contrast, a series of questions is required to specify peoples' actual work hours. This series might include some or all of the following: the time work begins, the time work ends, and whether the shift rotates. These questions may be asked with regard to most days during a reference week prior to the survey or for all days of the week. Although a time-consuming and more costly task, this procedure allows the researcher to precisely define different shifts according to specific rules. These rules, although explicit, vary by researcher, depending in part upon whether the investigator is considering starting time only or both starting and ending time, and whether shift rotation is taken into account. (A person who works during the day during the reference period of the survey may be a rotator, but this will be unknown unless shift rotation is asked.)

It would seem that in determining the prevalence of shift work for the country as a whole, we should want to be as precise as possible about our definitions and thus know exactly what is we are measuring; accordingly, it would seem preferable to ask a set of questions on specific work hours rather than rely on the respondent's more arbitrary self-classification.

Sources of national shift work data and their limitations

The data available to estimate the prevalence of shift work in the United States, assess its trend over time, and study the determinants and consequences, are very limited. I shall first

briefly describe the major data sources, and then subsequently summarize what is known based on these sources.

The best data we have on the prevalence of shift work in the United States is based on supplements to the Current Population Survey (CPS). The CPS is a household sample survey conducted monthly by the Bureau of the Census for the Bureau of Labor Statistics (BLS). A fixed schedule of employment and unemployment questions are regularly asked to determine the level of employment in the United States. The total number of households surveyed each month has varied, generally from about 55,000 to 60,000. Data are collected for all adult members of the household, and beginning in 1980 some basic demographic questions on children in the household were also asked. In May of each year, between 1972 and 1980, a supplement was added to the CPS with questions on the specific hours of employment (beginning and ending time) for the principal job held the previous week, and questions on multiple job holding (but none on the hours employed on non-principal jobs). In May of 1980, data were collected for the first time on whether or not the principal job was a rotating shift. All questions on specific work hours were asked only of wage and salary earners (self-employed are excluded).

Between 1980 and 1985, there were no supplements to the May CPS on work schedules. However, in May 1985 there was a supplement which went beyond the earlier ones to include questions on which days as well as hours people worked and the

hours work began and ended on second jobs, for multiple job holders. Whereas the work hours continued to be asked with regard to the reference week, shift rotation was defined differently in 1985, affecting the precision in which one can compare the 1985 results with earlier years. In May 1985 employed persons were also asked to self-categorize their usual work shift; interviewers were given rough guidelines to help if there was difficulty.[1] Unlike the previous May CPS supplements, in 1985 the shift work questions were asked of all employed persons, including the non-incorporated self employed. There have been no other May supplements since 1985 that include shift work questions. Thus, these 1985 data provide the most recent estimates available. However, to be discussed below, another national data source has just become available for 1987-88, and the Bureau of Labor Statistics is considering a supplement for May 1991 CPS that may include shift work questions.

In addition to the May CPS supplements, the June 1982 CPS supplement contained some shift work data. This supplement (sponsored by the National Institute of Child Health and Human Development) focused on fertility and child care, and included questions on the time work began and ended (but not shift rotation) for employed women with children under the age of five. The supplement provided the first opportunity to consider at a national level shift work in relation to child care use (since child care was not asked in the May supplements), although it is limited to women with preschool-aged children.

Until recently, the only other national view of shift work among the general population was the 1977 Quality of Employment Survey (QES). The QES is a national probability sample[2] of 1,515 persons 16 years of age and over who were working for pay for 20 or more hours per week. Although this survey was conducted in earlier years, only in 1977 were questions asked on the specific working hours of respondents and their employed spouses, if married. Moreover, because of the sample design and the definition of shift work, the published data are problematic in assessing the prevalence of shift work in the United States in that year.[3]

A very promising recent data source on shift work at the national level is the 1987-88 National Survey of Families and Households (NSFH), conducted by the Center for Demography and Ecology at the University of Wisconsin. The NSFH is a national probability sample of 13,017 respondents and for those married or cohabitating, their spouses and partners. This survey asks the most detailed questions on work schedules of any national survey to date, including the hours work began and ended for each day of the week and shift rotation. It also includes detailed data on family attitudes and behavior, providing a rich opportunity to provide a contemporary view of the relationship between shift work family life for a representative sample of employed Americans. However, no analyses have been completed as yet on this topic, although at least one is in progress (Presser, 1990c).

Although specific to a particular age cohort, another key data source for the study of shift work in the United States is the National Longitudinal Survey, Youth Cohort. The NLSY is a national probability sample of 12,686 persons aged 14 to 21 as of January 1, 1979, the year of the first interview, with annual interviews thereafter (1990 is currently in the field). The survey is conducted by the Center for Human Resource Research at Ohio State University. A self-defined shift status was asked of employed persons almost every year of the study. Beginning in 1983, employed persons with children were additionally asked the specific hours their work began and ended, as well as those of employed spouses if married, but shift rotation was asked in some years but not others. In 1988-90, the specific hours worked and shift rotation were asked of all employed persons, not only those with children, and all employed spouses if married. Thus it is not until sample respondents are aged 23 to 30 in 1988 that we begin to have a complete set of shift work questions on all employed persons in this cohort and their employed spouses, if married. (These recent data, however, have not yet been analyzed.)

The above data sources are all based on household surveys, and information is collected from one or more household members. The BLS also has collected data on shift work from employers in their Area and Industry Wage Surveys for various years dating back to 1959-60. Although the findings are reported specifically for the manufacturing sector in large metropolitan areas, these

sources are important because they provide unique data on pay differentials by shift status.

National estimates of the prevalence of shift work

Our best estimate of the prevalence of shift work for the United States is from the May CPS's, starting with 1973. Between 1973 and 1980, published tabulations by the BLS were limited to full-time nonfarm workers (employed 35 or more hours per week), and shift work was defined using both beginning and ending time. A "day" shift was defined as half or more hours of employment between 8 a.m. to 4 p.m.; an "evening" shift, when most hours were between 4 p.m. and 12 midnight; a "night" shift, when most hours were between 12 midnight and 8 a.m.; and a "miscellaneous" shift, when one worked less than 6 or more than 12 hours a day (including "split" shifts).

Based on these definitions, the prevalence of shift work changed little between 1973 and 1980, at least for full-time non-agricultural workers (trend data on part time workers are not available): about one out of six full-time workers were employed other than during the day (U.S. Department of Labor, 1981). This ratio, however, is an underestimate, since as previously noted, rotators were not identified prior to 1980. Accordingly, rotators who worked a day schedule in the "reference week" of the survey were classified as day rather than non-day workers. Adjusting for this misclassification in the 1980 data, I have estimated that one out of five (rather than six) full-time non-agricultural wage and salary workers in the U.S. were non-day

workers (Presser, 1986a). Again, these figures relate to the principal job only (5.4% of the employed population in 1985 were multiple job holders; Stinson, 1986).

The 1985 CPS data on work shifts for 1985 are not strictly comparable to that for 1973-1980 because of definitional differences, as noted above. Thus, only crude comparisons over time can be made, but they suggest little change in the overall prevalence of shift work between 1980 and 1985. From my own tabulations of the May 1985 CPS, I have estimated that about one in five non-agricultural workers (both wage and salary workers and self-employed, part time and full time combined) worked non-days. This is based on specific work hours (as in earlier years), but closely approximates the figures reported by the BLS, which are based on the respondent's self-categorization of his or her shift status and limited to wage and salary workers only, part time and full time combined (Mellor, 1986: derived from Tables 2 and 4).[4] According to the BLS figures, those working part time (less than 35 hours per week) were much more likely to be working a shift (47.5%) than those working full time (15.9%; Mellor, 1986).[5]

Again, the May CPS's are the key source of national data on the prevalence of shift work for the total population of employed persons. It is regrettable that we do not regularly obtain comparable data over time from this source so that we can rigorously assess the trend in shift work in the United States. As noted earlier, there are tentative plans for a May 1991 CPS

supplement that includes shift work questions, but whether there will be funding for this supplement and, if so, which shift questions will be asked is uncertain.

It should also be noted that although the overall sample sizes of the national studies that ask shift work questions are substantial, the actual number of shift workers in the samples are not sufficiently large to break them down by type of shift and numerous other categories. Thus, some of the analyses to be discussed below necessarily group different types of non-day workers together. It should be recognized, however, that from both a social and biological perspective, there may distinctive differences in the consequences of shift work by type of shift (e.g., fixed evenings vs. fixed nights or rotating). Moreover, for those persons reporting rotating schedules, these studies do not precisely differentiate rotation schedules that include night work from other rotation schedules.

Personal characteristics of shift workers

Cross-sectional analyses of the CPS's and other data sources noted above provide an assessment of the personal characteristics of shift workers in relation to regular daytime workers. A summary of what we know in this regard, based on published data, follows, focusing discussion on the most recent year for which data are available.

A basic personal characteristic is gender. Over the years, men have consistently been more likely to be shift workers than women. The difference is not substantial, however, when we

consider all those employed, both part-time and full-time workers. As of May 1985, 20.3% of men and 17.1% of women aged 18 and over in non-agricultural occupations were non-day workers (Presser, 1990a). Moreover, as may be seen in Table 1, among those employed, men are more likely than women to be working night, miscellaneous, and rotating shifts, whereas women are more likely than men to work the evening shift.

Gender differences in shift work prevalence are greater when one considers the full-time employed only. This is because women are more likely than men to work part time, and as noted above, part-time work is more likely to be shift work than full-time work. Considering only full-time wage and salary earners aged 16 and over, the BLS reports that 17.8% of men and 13.0% of women are shift workers (Mellor, 1986: Table 2).

With regard to other personal characteristics that distinguish shift workers from non-shift workers, shift workers are more likely to be young, single, and black; there is little difference in shift status between whites and those of Hispanic origin (comparisons based on full-time wage and salary earners in 1985; Mellor, 1986: Table 2). These patterns obtain when considering those who specifically work fixed night and rotating shifts, except there is no difference by race in shift rotation (Mellor, 1986: Table 2).

There is little difference in shift status for either men or women by presence of children in the household under age 14 (full-time and part-time employed combined, Presser, 1989: Table

1). For women only, the type of non-day shift has been considered in relation to presence and age of youngest child. Although women with children under age 6 are most likely to work non-days relative to those with no children or with school-age children only, this is because those with children under age 6 are most likely to work fixed evenings; it is women with school-age children only who are most likely to work nights; and women with no children or with children under age 6 who are most likely to be rotators. Although there are these differences, for all categories of women with and without children, it is evening work that is most prevalent (Presser, 1990).

Since the CPS collects similar data on all household members, it is possible to consider the work schedules of husbands and wives jointly when both are employed (dual-earner couples). Because it is rare that both spouses work the same non-day shift, the prevalence of shift work is high from a "couple" perspective. Based on the May 1980 CPS data, one-fourth of all dual-earner couples without children and one-third of all dual-earner couples with children included at least one spouse who worked other than a regular day shift (Presser, 1987a). An analysis of the May 1985 data for dual-earner couples with children showed a similar proportion as in May 1980 (one-third; Presser, 1990b).

Given that those who are young and those who have children are more likely to work non-standard hours than their counterparts, it is not surprising to find a remarkably high

prevalence of shift work among young dual-earner parents with children under age 5. It is estimated that about one-half of all such couples in the United States include at least one spouse who works non-standard hours (Presser, 1988). This estimate is based on an analysis of the parents in the NLSY as of 1984, when they were aged 19 to 26. (Only parents were asked the specific hours they worked in 1984.) Among those employed full time, mothers were about equally as fathers to work non-day shifts (29.0% and 30.2%, respectively); but there were gender differences in the type of shift: fathers were more likely than mothers to be working fixed non-days (19.1% vs. 14.8% respectively, and mothers were more likely than fathers to be working a rotating schedule (14.2% vs. 11.1%, respectively). Over one-fourth of all part-time employed mothers in this sample (26.9%) were rotators, and an additional 14.7% were fixed non-day workers; accordingly, about two-fifths of part-time employed mothers were non-day workers.

The prevalence of shift work, including shift rotation, thus is extremely high among the subgroup of Americans who at a potentially stressful time in the life cycle both economically and psychologically: those who are young, married, and with preschool-age children. Moreover, an analysis of shift work among mothers aged 18 to 44 with preschool-aged children, based on the June 1982 CPS, showed that the prevalence of shift work was considerably higher among those unmarried than married (Presser, 1986b). Thus, among those with children, it is both

young dual-earner parents and unmarried employed mothers--two particularly vulnerable groups--who are especially likely to be working non-day hours. Whether these particular subgroups are experiencing an increase over time in the prevalence of shift work is unknown.

Job characteristics of shift workers

Shift work is a consequence of both demand and supply factors that operate in our economy. On the demand side, certain manufacturing companies may wish to minimize capital expenditures, start-up and shut-down costs, and energy costs by operating on a continuous 24-hour basis or perhaps days and evenings but not nights; the need for temporary late shift workers to meet seasonal or unanticipated increases in demand is also relevant (King and Williams, 1985). Moreover, certain services may be in demand during non-standard hours because of the employment of persons during standard hours or the nature of the services performed (e.g., medical care or police protection). On the supply side, people may have particular preferences for non-daytime employment, perhaps related to better pay, less supervision, ability to go to school, or better able to arrange child care or the care of the elderly. I shall address the reasons for working non-standard hours shortly, but first it is relevant to consider the occupational and industrial distinctiveness of shift workers compared to those working standard daytime hours.

Table 2 presents the job characteristics of shift workers

based on the 1985 CPS; note that the BLS reports this only for full time wage and salary earners, and it is based on the respondent's self-designation of the shift worked. The occupational groups that have a disproportionately high percentage of shift workers (self-classified)--that is, substantially exceed the average of 15.9% (men and women combined)--are as follows: service occupations (39.4%); operatives, fabricators, and laborers (23.6%); and handlers, equipment cleaners, helpers, and laborers (21.1%). However, within all broad occupational groups, there are subgroupings of occupations that have a relatively high prevalence of shift workers. For example, although only 9.7% of professionals as a group are shift workers, this rises to 22.4% for professionals in health diagnosing occupations and to 31.3% for professionals in the health assessment and treating occupations. Among sales occupations, with 17.2% shift workers, the prevalence is 27.7% for retail and personal salesworkers. Moreover, for those broad occupational groups that are high in shift work, some subgroups of occupations are extremely high. For example, within service occupations, 60.8% of protective service workers (e.g., police and fire fighters) are employed during non-standard hours. Food service and health service workers are other examples (43.1% and 36.1%, respectively).

Table 2 also reports on shift status by industry, although again based on very broad groupings.[6] Those employed in the private sector are more likely to be shift workers (16.5%) than

those employed in the public sector (12.8%). Among those employed in the private sector, those in service-producing industries are more likely to be shift workers (17.6%) than those employed in the goods-producing industries (15.0%). And among those employed in service-producing industries, those employed in eating and drinking places (47.6%) and in entertainment and recreation (33.3%) are especially likely to be shift workers. Again, these data refer to full-time employed workers only; the figures would be higher if part-timers were included, since they are more likely than full-timers to be shift workers.

A more detailed analysis of the job characteristics of female shift workers was conducted based on the May 1985 CPS, and included women employed both full and part time, aged 18 and over (Presser, 1990a). Since this analysis focused on women employed at night, it considered the top seven occupations with the highest percent working fixed nights; these were (in rank order): registered nurses, nurses aides, practical nurses, food preparation and service workers, textile operatives, janitors, and cashiers. Over half (58.9%) of women who worked fixed nights were employed in these seven occupations , and close to half of those who worked evenings (49.1%) or a rotating shift (42.1%); in contrast, only 14.8% of those who worked fixed days and 19.4% of those who worked a miscellaneous shift (more than 12 hours a day, including split shifts), had these occupations. As for industry, 48.3% of all women who worked fixed nights in 1985 were in medical services, compared to 18.0% who worked fixed evenings,

20.5% who were rotators, 9.0% who worked miscellaneous shifts, and 11.2% who worked fixed days. For all women, the percent employed in medical services was 12.9, as compared to only 3.2 among all employed men.

A study of full-time dual-earner couples, based on the May 1980 CPS, showed that although employed wives are more likely than employed husbands to be service workers, service work produces a higher likelihood of shift work among husbands (50.7%) than wives (30.3%; Presser, 1987a). Within service occupations, the highest prevalence of shift work for husbands was among protective service workers (66.0%); the highest prevalence for wives was among health service (36.7%). This study also showed that union membership increased the likelihood of working non-days for both husbands and wives. (This would be expected if belonging to a union enhances the likelihood of receiving extra pay for working unusual hours of of working reduced hours for the same pay.) Although husbands (6.0%) were more likely than wives (2.6%) to be multiple job holders, being a multiple job holder increased the likelihood of wives--but not husbands--working a non-day shift on their principal job.

A multivariate analysis, which controlled for demographic and other job characteristics (including age, race, union membership, and multiple job holding), found that for both husbands and wives, most occupations and industries that were relatively high on shift work without additional controls were also high on shift work with these controls. In other words, the

high prevalences could not be explained away by occupational and industrial differences in these other characteristics of workers.

An analysis of young parents in the 1984 NLSY (those aged 19 to 26) who were employed full time revealed some distinctive employment differences by shift status, in addition to occupation and industry, but specifically for mothers (Presser, 1987b; the mothers and fathers in this sample were not necessarily married to one another). Among fathers, there were no significant differences by shift status in the percent employed in the past year or in the local unemployment rate, suggesting that the difficulty in obtaining a job is not an important determinant of shift work among such young men--even though they are especially likely to be shift workers. For mothers, however, the percent not employed in the past year was significant; mothers who worked fixed non-days (evenings and nights combined) were particularly likely not to have worked in the previous year. Also, among mothers but not fathers, fixed non-day workers were significantly more likely to be employed very long hours (50+ during survey week) than those working fixed days or rotating.

This study of young parents also considered the relevance of some geographical factors, and again there are gender differences. Among full-time employed mothers, fixed non-day workers were especially likely <u>not</u> to live in a Standard Metropolitan Statistical Area (SMSA), in contrast to fathers, among whom fixed non-day workers are <u>most</u> likely to reside in an SMSA. Moreover, among full-time employed fathers, fixed non-day

workers were least likely to reside in the South, whereas the difference by shift status was not significant for full-time employed mothers. These gender differences may reflect regional variations in the different labor markets for women and men.

Reasons for working shifts

Our only source of national data on the reason for working a non-day schedule is the May 1985 CPS. Respondents were asked what the main reason was for working their particular non-day shift. Answers were coded into subsets of "voluntary" and "involuntary" reasons. "Voluntary" included better child care arrangements, better pay, better arrangements for care of other family members, allows time for school, and other voluntary reason. "Involuntary" included could not get any other job, requirement of the job, and other involuntary reason. The BLS reported that only 28% all those not working a regular daytime schedule gave a voluntary reasons; 72% gave involuntary reasons, and 9 out of 10 of these cited the schedule as a job requirement (Mellor, 1986). There was no further detail provided in this report.

A separate analysis of the subgroup of dual-earner couples with children in the 1985 CPS considered the reasons why parents were working non-days (Presser, 1990b). It was found that fathers and mothers differ considerably in their main reasons for doing so. For only a small minority of fathers working non-days is child care (5.6%) or other family caregiving (2.5%) their primary reason, as compared to close to a majority of women

(34.3% for child care and 12.3% for other family caregiving). Better pay is not a common reason for either gender, although it is more relevant for men than women; this may be due to the fact that men are more likely to be union members, and union members may be more likely to receive pay differentials for non-day employment than non-union members.

Among these dual-earner couples, the main reason for working non-standard hours varies by type of shift as well as gender. Clearly, it is difficult to provide care to family members on a regular basis when a person works a rotating shift. Thus, those who work fixed non-days are more likely than rotators to do so primarily for caregiving reasons, either the care of children or other family members--including the elderly. As might be expected, the age of the youngest child is important: child care is most likely to be the reason for working non-day hours when employed wives have children under the age of six: 41.9% give this reason (Presser, 1990b). Child care is almost twice as likely to be the reason for married than unmarried mothers working non-day schedules (Presser, 1989a), even though--as previously noted--unmarried mothers are more likely to work non-day schedules than married mothers. This suggests that unmarried mothers experience much more limited job opportunities during the daytime than married mothers, and that this contributes substantially to their high prevalence of shift work.

Pay differentials in the manufacturing sector

The review of findings on the job characteristics of shift workers has thus far been based on studies based on household surveys. As previously noted, there are also Area and Industry Wage Surveys conducted by the BLS that provide some data on shift work and pay differentials, although limited to the manufacturing sector. The factories surveyed are only those in large metropolitan areas (SMSA's) and vary as to which industries are studied.

An integration of these survey data for different industries over the past two decades suggests little change overall in the proportion of manufacturing workers in SMSA's who work a late shift, defined as evening or night (excluding rotation); this is estimated to be one-fourth as of 1984--17.7% on evening (or second) shifts and 7.2% on night (or third) shifts (King and Williams, 1985). (There has been no comparable analysis since 1984.) The prevalence of late-shift workers varies considerably by industry, being highest among those that are capital-intensive, such as cotton and manmade textiles, cigarettes, and glass containers (about one-half of workers in each of these industries are late-shift workers).

About nine-tenths of the late-shift workers in urban manufacturing industries received premiums over the pay rates of their day-shift counterparts, although shift differentials did not increase as rapidly over time as did day-shift wage levels (King and Williams, 1985). In 1984, the amount of the shift

differential (when provided) was about 7.3% of day rates for the evening shift and 10.0% for the night shift, but the percentages varied widely among individual industries. There was a strong positive correlation between an industry's incidence of premium pay and its degree of unionization, suggesting that collective bargaining is an important determinant of shift differentials in the manufacturing sector.

Important unaddressed demographic issues

It is clear from the above review of both data sources and findings to date that our knowledge of the demographic aspects of shift work in the United States is seriously limited. We cannot adequately assess the overall trend over time in the extent to which employed Americans are working non-standard hours, no less consider the trends for specific subgroups: the young, minorities, men and women separately, dual-earner couples, etc. At the descriptive level, we are sadly lacking basic information about trends in the demographic and socio-economic selectivity of shift workers over time--whether they are becoming more or less distinctive relative to regular daytime workers, and what the implications of such trends are for the economy, families, and individuals.

It is important to take a life course perspective as well. Shift workers today may be daytime workers tomorrow, and vice-versa. We need to study the relevance of marriage, childbearing, and childrearing, as well as the effect of aging itself, on transitions in and out of shift work. Moreover, among shift

workers, there may be considerable movement between fixed evening and night work, as well as from fixed late shifts to shift rotation, and vice-versa. Thus we need to consider not only what the determinants and consequences are of being a shift worker at a particular point in time, but the determinants and consequences of the timing, duration and sequencing of different shifts. The longitudinal data available on shift work--as yet not analyzed--are minimal, restricted to a young cohort over a short period of time, and do not provide <u>continuous</u> work schedule histories on workers but rather shift status at single (yearly) points in time.

There are many job characteristics other than occupation and industry that need to be studied to help better understand the socio-economic context in which shift work occurs in our society. For example, we know nothing at the national level about income differences by shift status for those with similar occupations and industries. Moreover, we need to go beyond the urban manufacturing sector in considering the issue of pay differentials. Such important issues as the relation of overtime and multiple job holding to shift work at the national level also merits intensive study.

Given the sex segregation of the labor force, it is important that the issues noted above be addressed separately for men and women, and that we consider the implications of gender differences that undoubtedly will be found.

Although study of the demographic selectivity of shift

workers can help to assess indirectly the reasons people work non-standard hours, we need a more in-depth understanding of why people work these hours and the trade-offs they see, both positive and negative. This would provide an important context in which to assess the health, economic, and social consequences of working non-standard hours--not only for the shift workers themselves, but also for members of their family, including young children and elderly parents. Such information is vital to employers as well. The next section of this paper looks specifically at what we know about the social consequences.

The Social Implications of Shift Work in the United States

Our knowledge of the social consequences of shift work for Americans at the national level is minimal. Much of what is known is based on small samples of men in particular manufacturing firms. It is difficult to generalize the findings of these small-scale studies to all shift workers; moreover, most of these studies are seriously outdated.

Consequences for marital relationships

Two noteworthy studies at the national level consider the consequences of shift work for the marital relationship. One is a secondary analysis of the 1977 Quality of Employment Survey, conducted by the Survey Research Center at the Institute for Social Research, University of Michigan (Staines and Pleck, 1983). In this analysis, 1,028 married couples are studied in relation to their shift work status (including 500 dual-earner

couples). The investigators found that shiftwork is associated with a lower quality of family time, because the time available comes at the wrong period of the day. They also found that family conflict was greater when one of the spouses works a non-day shift.

The other national study, based on a 1980 survey by Booth, Johnson, and White, considers both the quality and stability of marital relations over time (White and Keith, 1990). Although the shift work measure is weak (a "yes" or "no" response to the question of whether their job involved shift work, undefined), the researchers report that shift work has a modest effect on marital quality (using six different measures), and increases the probability of divorce from 7% to 11% over the three-year period under study. Both studies consider both the husband's and wife's shift status.

Smaller more in-depth studies of shift work have focused almost exclusively on blue-collar workers in specific industrial settings. If females are included, they are typically the wives of male shift workers, and the employment status of these wives receives little if any attention. Thus, the findings concerning family life are reported from a biased perspective on many counts and generally are not compared to control groups of workers on a regular daytime schedule. These limitations generally are true of both American and European studies, although in-depth examination of shift work and family life is mostly European. The findings from these studies, American and European, suggest

that male shift work generates extra strains of family life: men have difficulty performing their traditional roles, such as protecting the family and being a sexual partner and companion (Banks, 1956; Brown, 1959; Maurice and Monteil, 1965; Mott et al., 1965; Piotrkowksi, 1979; Ulick, 1957; Wayatt and Marriott, 1953; Young and Wilmot, 1973); women have difficulty performing their traditional roles, typically expressed as problems with domestic routines such as meal preparation, laundry and child care (Banks, 1956; Brown, 1959).

This traditional view of family life is evident in the most extensive American study of the social, psychological, and physical consequences of shift work, conducted in the early 1960s (Mott et al., 1965). Shift workers are described in the general introduction as though they are all male and all in the manufacturing sector, adapting to a "machine environment" (p.7). (In 1965, when this book was published, over one-third of the labor force was female.) Moreover, the relevance of shift work for blacks and other racial minorities is not discussed. The sample is comprised of 1,045 white, male, blue-collar workers in continuous-process industries in the east-central part of the United States who completed detailed questionnaires; 661 wives of married male shift workers were also studied (without addressing their employment status). Despite its limitations, this study represented a significant step forward in our knowledge of the social aspects of shift work--at least for one important subgroup of our society--and no comparable in-depth study of shift work in

the United States has since been conducted (with or without the drawbacks noted above).

Consequences for the care of children

In recent years, a renewed interest in the social aspects of shift work in the United States has emanated from research on child care. The findings of two national surveys suggested that, with the rise in dual-earner couples, split shifts between spouses may be a common mode of arranging child care (Morgan, 1981; Presser, 1982). This would help to explain why close to one-fifth of all employed married mothers with preschool-aged children were reporting that fathers were the primary caregivers when these mothers were at work (Presser, 1982).

The June 1982 CPS, which included questions on the shift status of women as well as child care questions for women with children under age 5, confirmed this expectation, as did the analysis of the 1984 NLSY cohort of young parents which included shift work and child care questions for both fathers and mothers (Presser, 1986b, 1988). In almost all cases in which the father was at home when the mother was employed, and the father did not have a rotating shift, the father was the principal caregiver of the child at that time.

As noted earlier in the discussion of reasons for working nonstandard hours, fathers are much less likely than mothers to do so for child care reasons. Nevertheless, whatever the reason, the consequence of spouses working nonoverlapping hours, for dual-earner couples with young children, is that fathers become

the principal caregivers when mothers are employed.

It is not just dual-earner spouses who share child care when the other is employed. So, too, do mothers and grandmothers, particularly unmarried mothers with young children. A study based on the 1984 NLSY showed that one-third of grandmothers who provide child care for their grandchildren are otherwise employed; they are working different shifts those of employed mothers (Presser, 1989b).

On the more general issue of parental time spent with children, a recent national study found that shift work did not affect the total amount of time (children ranged up to age 20; Nock and Kingston, 1988). When it is only fathers, but not mothers, who are employed, shift-work fathers may feel they are not spending enough time with their children, especially if they sleep during the day when their children are home from school. A small-scale study, now three decades old, found the presence of children related to men's negative feelings about shift work (Mann and Hoffman, 1960). However, one small British study found that preference for night work was related to fathers wanting more time with their family (De la Mare and Walker, 1969).

There appears to be only one study in all of the shift work literature that considers the consequences of shift work for child outcomes. A Belgian study of elementary-school children showed higher academic achievement when fathers work day rather than nonday hours--but this was attributed to differences in children's intelligence (Maasen, 1978).

Important unaddressed social issues

There are many unaddressed social issues regarding the consequences of shift work, reflecting the limited amount of research that has been done. Thus we do not have an adequate sense of how problematic shift work is for the social lives of individuals, their families, or the community.

In considering the social consequences, it is important to distinguish the type of shift; that is, the social consequences of shift rotation may be quite different from that of fixed night work, and fixed night work may have different social consequences than fixed day work. Moreover, it is important to recognize that there may be positive as well as negative social aspects to shift work, and the extent to which the decision to work nonstandard hours may be contingent on many factors. Possible contingenices may be the presence and age of children, marital status, school enrollment, and whether many others in the community (including friends and relatives) are shift workers.

Further, people may be trading some positive social aspects of shift work for some negative ones. Consider a hypothetical case of a woman with school-age children who works fixed nights. While she is at work, her (sleeping) children are being cared for by her husband, if married, or a relative. She sleeps when her children are at school. Thus, she is home caring for her children when her children are home and awake. This schedule of employment maximizes maternal time with school-age children, and minimizes the cost of working by minimizing the cost of child

care after school. Although there may be some negative health consequences of working nights for the woman herself, such as sleep disturbances or digestive problems, she may view this as worth the cost, given the childrearing benefits. Similar scenarios may be applicable as well to fathers who work nights and care for children during the daytime--although apparently less so.

Studies are needed that consider both the health and social aspects of shift work jointly, and--as noted earlier--from a longitudinal perspective, so that we can determine people's perceptions of the tradeoffs to be made and how these perceptions change over time as people experience the actual costs and benefits and as their personal situations change.

It is particularly disturbing that we know so little about the effects of shift work on children. Children of unmarried mothers are particularly important to study, given that these mothers are especially likely to work nonstandard (and long) hours (Presser, 1989) and fathers are absent.

Our understanding of the effect of shift work on married spouses as individuals and on the quality and stability of the marital relationship is also minimal and merits further study, both for single-earner and dual-earner couples. Whether the total work loads of women (family work and paid work combined) is especially excessive in dual-earner households with a shift worker is an important consideration.

Improving Our Knowledge

This review of the demographic and social aspects of shift work has pointed to our very limited knowledge in this area. This is a serious problem for at least three basic reasons.

Why we need to know more

The first reason is that the prevalence of shift work in the United States is substantial and may well increase beyond the most recent estimate of one in five employed persons, given the projected growth of the service economy. Not only does the service sector have a higher prevalence of shift work than the goods-producing sector, but the largest absolute job growth over the next decade is expected in those service jobs that an unusually high proportion of shift workers: waiters and waitresses, registered nurses, janitors and cleaners, and cashiers (Presser, 1989). Contributing to the growth of shift work, particularly for women, is the aging of the population (a consequence of declining fertility and mortality trends in our country). Older populations increase the demand for medical services, and such services entail a high proportion of women who work non-daytime hours, including nights (Presser, 1990a). Thus we have a widespread phenomenon occurring in our society which will undoubtedly increase, and we are unable to assess the trend with current measures.

Secondly, a better understanding of the demographic and social aspects of shift work will help us to improve morale and productivity at the workplace and the health and psychological

outcomes of individual workers. Only when we can identity the distinctive demographic and social characteristics of people who are most--or least--adaptive to shift work can we meaningfully consider ways to maximize the positive outcomes of such practice and minimize the liabilities--for employers and employees alike.

The third basic reason for improving our knowledge of the demographic and social aspects of shift work is that it undoubtedly has profound implications for family life--and we need to articulate them empirically. As noted elsewhere,

> ...time is the central organizing feature of family activities. The growing diversity of work schedules, by changing the amount of time that family members have together, may be radically changing family life. Not only are mothers spending less time with their children than in the past, and children less time with fathers because of separation and divorce, but mothers fathers, and children in intact families are spending less time together as a family unit because parents are working different hours or days (Presser, 1989, p.536).

To fail to study the consequences of shift work for men, women, and children, separately, and for family life as a whole, is to fail to have a proper view of contemporary--and future--family life. Proposing social policies that rely on outdated stereotypes of the family does not serve our country well.

Recommendations for obtaining needed data

How do we go about doing shift work research to fill the void? To study the basic demographic aspects of shift work, the government needs to make a long-term commitment to collect such data in the May CPS supplement at intervals of every three to five years. It is essential that questions on the specific hours worked and shift rotation are asked for all employed household

members, rather than relying soley on the respondent's self-categorization. Moreover, it is essential that shift work questions be repeated in an identical way over the years, so that we have comparable cross-sectional data to assess the trend over time. The design of the May CPS supplement on shift work should be done with the advise of a standing committee of experts on this topic outside the government, and BLS should either undertake itself or commission elsewhere highly detailed analyses of shift work based on this data source. The May 1991 CPS supplement that is tentatively planned to include shift work questions should in fact do so, and as specified above. Again, we have no national estimate of the prevalence of shift work since 1985.

In addition to a short supplement to the May CPS at intervals of every three to five years, we need to address the substantive issues previously noted with longitudinal data for different age cohorts. The NLSY is a valuable source data source for a single (young) age cohort and should be continued with an effort to get <u>continuous</u> work schedule histories that cover the time between surveys (as it collects continuous job histories). However, this survey alone is inadequate to address the many neglected substantive issues relating to shift work noted above. Moreover, with a single age cohort, it is difficult to disentangle the effects of aging from period effects; for example, events that occur in a given year--such as a recession--may affect a given cohort at a particular age, but not be an

aging effect per se.

We have had to rely for all our national data on shift work on the "piggy-backing" of shift work questions to other surveys that do not exclusively or even primarily focus on the issue of work schedules. As previously noted, the 1987-88 National Survey of Families and Households (a cross-sectional survey) included an extensive set of questions on work schedules which can be related to other questions on family life, but this is not sufficient. Although relying on such "piggy-backing" is valuable in the absence of alternatives, we need well-designed large-scale longitudinal surveys that specifically focus on both the determinants and consequences of shift work in the United States. In short, we need to give serious attention to this widespread practice which undoubtedly has profound implications for employees and their families, for employers, and for society at large.

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NOTES

1. The CPS obtains information on all household members from one adult member. Accordingly, the work schedules of all employed persons are reported by one person, and thus more subject to error than if truly "self" reported.

2. A national probability sample is a sample selected on the basis of statistical procedures that, with appropriate weighting, represent the total United States and can be generalized accordingly.

3. Both part-time and full-time workers were grouped together, with no minimum hours required for the employment of spouses of respondents but a 20-hour minimum for respondents. Shift workers were defined as those who did not begin work between 3:30 a.m. and 11:59 a.m., and thus include spouses who work a few hours in the afternoon.

4. All published tabulations on shift work by the BLS for 1985 are based on self-categorization and limited to wage and salary workers.

5. Prior to 1985, BLS reported only on the shift status of those employed full time.

6. Industry refers to the nature of the business of the person's employer, as distinct from occupation, which refers to the type of work in which a person is engaged. Accordingly, a computer data entry worker employed in a hospital would be included in the occupational group "computer equipment workers" and in the industry group "services: hospitals."

Table 1. Percentage Distribution of Employed Persons Aged 18 and Over in Non-agricultural Occupations by Work Shift according to Gender: United States, May 1985.

	Work Shift						
						Total	
Gender	Fixed day	Fixed evening	Fixed night	Misc.	Rotating	%	(N)
Men	79.7	7.7	2.7	5.1	4.8	100.0	(30,731)
Women	82.9	8.5	1.9	2.4	4.2	100.0	(25,601)

Note: Fixed and miscellaneous shifts derived by using actual hours work began and ended most days in the reference week. Date include all self-employed and both full-time and part-time workers.

Source: Presser, 1990a.

Table 2. Percentage Distribution of Full-time Employed Wage and Salary Workers by Work Shift according to Occupation and Industry: United States, May 1985.

Occupation or industry	Total employed (in thousands)	Regular daytime schedule	Shift workers					
			Total	Evening shift	Night shift	Rotating shift	Split shift	Other shift
Total, 16 years and over	73,395	84.1	15.9	6.3	2.7	4.3	0.7	1.9
Occupation								
Managerial and professional specialty	18,944	91.4	8.6	2.0	1.2	2.7	.6	2.1
Executive, administrative, and managerial	9,079	92.6	7.4	1.8	.8	2.8	.5	1.8
Professional specialty	9,866	90.3	9.7	2.3	1.5	2.8	.8	2.3
Health diagnosing occupations	212	77.6	22.4	1.7	–	13.6	–	7.2
Health assessment and treating occupations	1,257	68.7	31.3	8.3	8.3	12.1	.1	2.6
Technical, sales, and administrative support	21,961	88.3	11.7	4.2	2.1	3.5	.5	1.3
Technicians and related support	2,548	84.5	15.5	6.5	3.3	4.6	.1	1.0
Health technologists and technicians	761	70.1	29.9	12.5	9.0	7.6	.2	.6
Sales occupations	6,730	82.8	17.2	4.1	2.2	6.9	1.1	2.9
Supervisors	1,957	84.0	16.0	2.8	2.1	7.4	1.3	2.4
Salesworkers, retail and personal services	2,400	72.3	27.7	8.3	3.8	11.5	1.1	3.2
Administrative support, including clerical	12,684	92.0	8.0	3.7	1.7	1.8	.3	.6
Computer equipment operators	673	81.2	18.8	11.0	2.7	4.1	–	1.0
Mail and message distributing	613	76.2	23.8	12.7	8.1	.4	.6	1.1
Service occupations	7,268	61.6	38.4	16.9	6.1	8.7	2.4	4.3
Private household	275	83.0	17.0	7.3	1.9	–	1.0	6.8
Protective service	1,286	39.2	60.8	19.8	7.2	23.8	.7	9.4
Service, except private household and protective	5,707	65.6	34.4	16.7	6.1	5.7	2.8	3.0
Food service	2,194	56.9	43.1	21.2	5.3	8.2	5.0	3.4
Health service	1,076	63.9	36.1	14.8	10.3	6.8	.6	3.6
Cleaning and building service	1,719	74.4	25.6	16.1	5.4	1.7	1.3	1.1
Personal service	718	73.9	26.1	7.5	3.7	6.2	3.0	5.7
Precision production, craft, and repair	10,477	87.0	13.0	6.3	2.2	3.7	.1	.7
Mechanics and repairers	3,582	87.3	12.7	6.0	2.3	3.6	.1	.8
Construction trades	3,282	94.1	5.9	3.4	1.0	1.2	.1	.3
Other precision production, craft, and repair	3,614	80.3	19.7	9.3	3.2	6.1	.2	.9
Operators, fabricators, and laborers	13,326	76.3	23.7	10.5	4.6	6.2	.5	1.9
Machine operators, assemblers, and inspectors	6,748	76.3	23.7	13.2	3.7	6.2	.1	.5
Transportation and material moving occupations	3,448	73.8	26.2	5.8	6.0	7.4	1.5	5.5
Motor vehicle operators	2,292	74.5	25.5	4.3	6.9	5.9	1.9	6.5
Handlers, equipment cleaners, helpers, and laborers	3,130	78.9	21.1	9.9	5.2	4.9	.2	.9
Farming, forestry, and fishing	1,418	89.9	10.1	1.5	1.4	.7	3.5	3.0
Industry								
Private sector	60,127	83.5	16.5	6.6	2.9	4.4	.8	1.9
Goods-producing industries	24,626	85.0	15.0	7.4	2.6	3.9	.3	.8
Agriculture	1,154	89.4	10.6	.9	2.2	.2	4.3	3.0
Mining	885	78.1	21.9	6.0	1.6	12.1	–	2.2
Construction	4,279	97.5	2.5	1.3	.4	.4	–	.4
Manufacturing	18,309	82.1	17.9	8.3	3.2	4.5	.1	.7
Durable goods	11,277	84.0	16.0	10.0	2.5	2.8	.1	.5
Nondurable goods	7,033	79.1	20.9	8.2	4.4	7.2	.2	1.0
Service-producing industries	35,501	82.4	17.6	6.1	3.0	4.8	1.1	2.6
Transportation and public utilities	4,958	79.4	20.6	6.1	3.5	6.4	1.2	3.5
Wholesale trade	3,222	91.9	8.1	2.9	2.1	.9	.4	1.7
Retail trade	9,111	73.7	26.3	9.1	3.7	8.6	1.9	3.0
Eating and drinking places	2,242	52.4	47.6	21.0	5.3	12.5	4.5	4.2
Finance, insurance, and real estate	5,003	93.9	6.1	1.9	1.0	1.1	.5	1.6
Services[1]	13,207	82.9	17.1	6.4	3.3	3.9	1.0	2.6
Private households	345	80.8	19.2	7.3	1.5	.7	.8	9.0
Business and repair	3,242	87.4	12.6	5.8	2.4	3.1	.1	1.0
Personal, except private household	1,379	74.0	26.0	10.1	3.8	6.6	2.1	3.4
Entertainment and recreation	529	66.6	33.4	13.8	2.2	7.3	4.1	6.1
Professional services	7,682	83.8	16.2	5.4	3.7	3.6	.9	2.5
Hospitals	2,303	73.0	27.0	10.5	6.6	8.5	.2	1.3
Public sector	13,268	87.2	12.9	4.8	2.0	3.7	.6	1.9
Federal Government	2,901	86.2	13.8	6.1	3.4	2.8	.2	1.2
State government	3,320	88.2	11.8	4.3	2.3	3.0	.5	1.7
Local government	7,047	87.1	12.9	4.2	1.3	4.5	.7	2.2

[1] Includes forestry and fisheries, not shown separately.

Note: Data refer to wage and salary workers, excluding the incorporated self-employed, who were at work during the reference week. Dash indicates fewer than 0.05 percent. All shifts are self-categorized by the respondents. Part-time workers are excluded from this table.

Source: Mellor, 1986.